



Chesapeake Bay Governor's School
For Marine and Environmental Science
Warsaw Campus

Statistical Methods and Data Analysis (MTH 240)

Spring 2016

Mark D. King

Course Description:

The goal of this course is to introduce students to statistical methods with a particular emphasis on their application to marine and environmental science. There will be a significant lab component in which students will be required to apply statistical methods to phenomena that they might encounter in the field. After an introduction to the problems that statistics as a discipline seeks to address, students will learn to calculate probabilities. We will then consider methods of summarizing, presenting, and interpreting data that serve as the foundation of statistical analysis. Students will calculate and apply measures of central tendency, measures of variation, and measures of position. They will understand the significance of the normal and standard normal distribution, as well as the central limit theorem. In preparation for senior projects, students will learn to apply various methods of hypothesis testing and to determine when each is appropriate, and will learn to identify degrees of correlation in their data. Finally, students will be able to perform an analysis of variance (ANOVA) for data sets with multiple independent variables.

Text:

Triola, Mario F. *Elementary Statistics*. 11th ed. Boston, MA: Pearson, 2010.
*Your textbook is the property of CBGS. Please **cover** your textbook and keep it covered all year!*

Course Credit: 3 credits

Contact Information:

Office: (804) 333-1306

E-mail: mking@cbgs.k12.va.us

Cell: (804) 313-1920

Required Materials:

Students will need a notebook (or 3-ring binder), pencils, erasers, graph paper, and a graphing calculator.

Schedule of Topics Covered:

Unit 1 (Chapter 1):

- Course Introduction
- Methods of Data Collection and Sampling
- Observational and Experimental Studies
- Interpreting Statistics

Unit 2 (Chapter 4):

- Probability

Unit 3 (Chapters 2 and 3):

- Methods of Organizing and Presenting Data
- Distributions of Data
- Measures of Central Tendency

Unit 4 (Chapter 3 and 6):

- Measures of Variation
- Standard Error

Unit 5 (Chapters 3 and 6):

- Properties of a Normal Distribution
- The Standard Normal Distribution
- Measures of Position
- The Central Limit Theorem

Unit 6 (Chapter 7):

- Confidence Intervals

Unit 7 (Chapter 8):

- Methods of Hypothesis Testing
- z Tests for the Mean
- t Tests for the Mean
- Testing the Difference Between Two Means

Unit 8 (Chapter 10):

- Correlation
- Regression

Unit 9 (Chapter 11):

- Analysis of Variance
- Post Hoc Testing

Additional topics may be covered if time permits.

Course Information and Policies:

Assignments:

Students should expect one or more short **quizzes** for each unit, as well as tests on units 1 and 2. Starting with unit 3, the course will involve a significant lab component in lieu of unit tests. Students will be expected to apply their knowledge of statistical methods to data sets much like those they might encounter working in the field as marine and environmental scientists. Although students will work together on the labs, each student must turn in his or her own work and will be graded individually.

Students will be assigned homework in MathXL on a regular basis. Worksheets and problems from the textbook may also be periodically assigned.

Grading:

MathXL assignments will be graded based on the student's final score upon submission. There will be many of these assignments, so it is crucial to keep up with them in order to do well in the course. Homework from the textbook will **not** be graded unless I indicate otherwise.

Assignments will be graded on a point system. Each assignment has a specific number of points available. Your grade for that assignment can be found by dividing the points received by the total points available. Tests and labs will be worth considerably more points than other assignments.

I will regularly post grades on Schoology.

Letter Grade:

90 – 100%: A 80 – 89%: B 70 – 79%: C 60 – 69%: D 0 – 59%: F

Make-up work policy:

If you miss a class, you are responsible for discovering what work you missed. If you are absent on the day of a test or quiz you will be required to make it up on the day that you return to class as they are scheduled well in advance. You will not be allowed to make up tests or quizzes missed due to an unexcused absence.

Attendance:

Class attendance is required. The course attendance policy can be found in the Student Handbook. I will record absences and tardiness each class.

Academic Dishonesty:

As set forth in the student handbook, students are required to abide by the CBGS Student Honor Code. If academic dishonesty is discovered, the honor code mandates severe and specific penalties that *will* be enforced.

Cell Phones:

Students are required to **turn off** and **put away** their cell phones once class begins. Students may use their phones in class only as instructed by the teacher. Playing games, taking photos, or texting friends is never acceptable. The official CBGS cell phone policy can be found in the Student Handbook.

Emergency Evacuation Plan:

In each classroom, laboratory or other places where students are assembled for the purpose of instruction, a fire evacuation plan will be posted indicating the direction of travel from the room in the event it becomes necessary to evacuate the building as a result of fire or other emergency. This plan will be posted in a conspicuous place near the exit from the room. Whenever the fire alarm sounds, the building will be evacuated. The instructor will ensure the fire door is closed upon leaving the area (doors with automatic closures on them). Instructors are also responsible for assisting disabled students. If a classroom does not have an evacuation plan posted, the student or instructor should notify the academic dean.

CBGS Statement on Safety:

What to know and do to be prepared for emergencies at CBGS/RCC:

- Sign up to receive RCC text messaging alerts and keep your information up-to-date
<<https://alert.rappahannock.edu/index.php?CCheck=1>>
- Know the safe evacuation route from each of your classrooms. Emergency evacuation routes are posted in campus classrooms.
- Listen for and follow instructions from CBGS/RCC or other designated authorities.
- Know where to go for additional emergency information.
- Report suspicious activities and object

Statement on Americans with Disabilities Act:

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 require Schools to provide an 'academic adjustment' and/or a 'reasonable accommodation' to any qualified individual with a physical or mental disability who self-identifies as having such. Students should contact/ inform CBGS faculty for appropriate academic adjustments or accommodations.